2nd UGCT seminar
10 September 2015

X-ray µCT analysis of sediment cores from Eklutna Lake

Elke Vandekerkhove[1], Maarten Van Daele[1], Veerle Cnudde[2], Nore Praet[1], Pieter Vanderniepen[3], Peter J. Haeussler[4] and Marc De Batist[1]

[1]Renard Centre for Marine Geology, Department of Geology and Soil Science, Krijgslaan 281/S8, B9000 Gent, Belgium

[2]Centre for X-Ray-tomography (UGCT) / Dept. of Geology & Soil Science, Ghent University, Belgium

[3]Centre for X-Ray-tomography (UGCT) / Dept. of Physics & Astronomy, Ghent University, Belgium

[4]USGS-Alaska Science Center, 4210 University Dr., Anchorage, Alaska, United States

ABSTRACT

Lake Eklutna is a glacial lake located close to the Alaskan-Aleutian subduction zone which generated the second largest earthquake ever recorded (1964 AD, Mw = 9.2). Such earthquake events are able to trigger turbidity currents and cause major slope collapses to develop along the sides of the lake basin. Previous studies on sediment cores from Eklutna Lake revealed the presence of many turbidite deposits. However, these are not only linked to earthquake events but can also be caused by delta collapses due to slope instability or flood events. Therefore, we analyzed sediment cores from Eklutna Lake on the potential to differentiate between turbidites originating from floods and earthquake-triggered turbidites. This way, an accurate interval rate of earthquakes can be established. The sediment cores were scanned with the X-Ray CT scanner in order to analyze the turbidite deposits and 3D structures. Using the X-Ray micro-CT scanner HECTOR at UGCT, individual particles could be visualized in the turbidite deposits. Preliminary results indicate the presence of ripple structures and alignment of organic matter at the bottom of the turbidites, which contribute in determining relative flow directions. Our study also revealed the possibility to distinguish cryptotephra using X-Ray µCT-scanning. This would have important implications for tracking cryptotephra and sampling methods in core sediments. Finally, bioturbation was observed throughout all cores while varve formation requires, in addition to seasonal variation, the absence of bioturbation and usually form under anoxic conditions.

REFERENCES

Masschaele, B., Dierick, M., Van Loo, D., Boone, M.N., Brabant, L., Pauwels, E., Cnudde, V., Van Hoorebeke, L., 2013: HECTOR: a 240kV micro-CT setup optimized for research. *Journal of Physics: Conference Series.* 463 (1), p. 012012.